ALBUERO, ANNE N. Peer Reinforcement as a Function of Teacher Reinforcement in the Modification of Deviant Behavior in a Kindergarten-age Boy. (1974) Directed by: Dr. Nancy White. Pp. 64.

While recent research has shown that the social behaviors of a child's peer group exert substantial control over his school-related behavior, attempts to systematically manipulate responses for the purpose of adjusting problem behaviors of individual children have received little attention in the literature. The present study investigated several methods of directing peer reinforcement responses in an effort to modify the anti-social behaviors of a six year-old boy with the teacher acting as the behavior change agent. Various behaviors of both the subject and his peers were recorded under the following conditions: baseline (no treatment); peers instructed by teacher to reinforce socially subject for "being good" (pro-social behaviors); instructions by teacher to peers to reinforce appropriate and to ignore inappropriate subject behaviors as promoted by a 2-light signal device operated by teacher, and; teacher instruction with visual prompt (as above) plus specific social reinforcement by teacher of appropriate peer responses. In general, the final condition involving teacher instruction plus prompts plus teacher reinforcement resulted in the highest rates of both appropriate peer and appropriate subject behaviors. Both teacher instructions alone and teacher instructions plus visual prompt, however, resulted in improved

peer and subject behaviors as compared with baseline performances. Periodic reversals to baseline conditions were programmed among the treatment conditions and resulted in rapid deterioration of both peer and subject behaviors. While this latter finding suggested that observed behavioral improvement was functionally related to the experimental manipulations, it also suggested a need for further research aimed at improving the durability of the effects obtained.

PEER REINFORCEMENT AS A FUNCTION OF TEACHER REINFORCEMENT IN THE MODIFICATION OF DEVIANT BEHAVIOR IN A KINDERGARTEN-AGE BOY

by

Anne N. Albuero

A Thesis Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Master of Science in Home Economics

Greensboro
1974

Approved by

Nancy White
Thesis Adviser

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Thesis Adviser Nancy White

Committee Members Jane K. Cowan

J. Allen Watson

Bobby J. Jones

February 4, 1974
Date of Acceptance by Committee

ACKNOWLEDGEMENTS

I wish to thank my committee, my advisor Dr. Nancy White, Dr. Jane Crow, and Dr. James A. Watson for their support of this thesis. I am especially indebted to Dr. Robert J. Jones for his technical assistance and continual guidance and support. I am appreciative of the staff at the Institute for Child and Family Development in which the kindergarten was located for enabling me to serve as the teacher, thus making the study possible. I would like also to thank Nancy Cundiff for the preparation of the figures.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Peer group behavior has gone largely uninvestigated as a source of, and treatment for, behavior problems. Traditionally, therapeutic techniques have concentrated on modifying inward characteristics of the subject, bringing to awareness subconscious and preconscious factors. On the other hand, operant conditioning theory suggests that behavior is a function of variables in the organism's environment impinging upon the organism (Skinner, 1953). Many behaviors become established, or learned, as a result of a contingent relationship between a behavior and specific consequences. These contingent consequences determine the future probability of the behavior. Thus, for the young child with a behavior problem, operant conditioning theory indicates that if behavior is to be changed, positive consequences or reinforcement must be given for appropriate behavior (Skinner, 1953). More specifically, however, in the case of social behavior, the consequences per se are neither "necessary" nor "sufficient" to induce change, but, rather, "significant" (Patterson, McNeal, Hawkins & Phelps, 1962; Patterson, 1971). Instead, the dispensers of the reinforcement who shape and maintain behavior are necessary and sufficient. Parents, teachers, and peers constitute

the social environment of the young child; they dispense consequences and, furthermore, receive consequences for their behavior. Therefore, it would seem incumbent upon anyone seeking to modify a behavior problem to identify the social variables and modify the social environment.

Applying principles of reinforcement theory as a solution to behavior problems in children has been successfully demonstrated. A major thrust of behavior modification programs has been the training of classroom teachers in appropriate techniques (Harris, Wolf & Baer, 1964; Allen, Hart, Buell, Harris & Wolf, 1965; Patterson & Brodsky, 1966; Hall, Lund & Jackson, 1968; Madsen, Becker & Thomas, 1968; Hall, Cristle, Cranston & Tucker, 1970; Packard, 1970; Medland, Michael & Stachnik, 1972). In other programs, mothers have been trained to become therapists for their children in the home (Hawkins, Peterson, Schweid & Bijou, 1966; Bernal, Duryee & Burns, 1968; Zeilberger, Sampen & Sloane, 1968; Wahler, 1969; Hall, Cristler, Cranston & Tucker, 1970; Herbert & Baer, 1972) and, to a lesser extent, in the classroom (Patterson & Brodsky, 1966; Patterson, 1966). Very little attention has been given to studying the effects of the peer group as a source of reinforcement for a child's behavior, and less to training peers to be treatment agents.

It would seem that a treatment program could be highly effective only when the teacher manages himself as a source

of reinforcement, concurrently with managing the child's peer group. From a practical point of view, systematic management of peer behavior as a means of controlling a classmate's behavior is almost a necessity to relieve the teacher of the sole responsibility for controlling classroom behavior. In addition, if the reinforcement schedules (see Definitions p. 6) provided by the social environment are to be arranged as well as the contingencies for maintaining the behavior of these dispensing reinforcements, investigation of the relationship between teacher reinforcement and peer reinforcement as treatment variables in the modification of deviant behavior in children seems warranted.

Purposes of the Study

The objectives of the present study were to: (a) determine the extent to which pre-school children dispense reinforcement for deviant behavior and ignore prosocial behaviors of classmate; (b) train children to discriminate adaptive and deviant behaviors and to give appropriate differential reinforcement for them; (c) determine whether the peer group, having been trained in the appropriate dispensation of social reinforcers, would continue to do so without benefit of specific programmed reinforcement from the teacher; and (d) determine the effect of peer-dispenses social reinforcers on increasing adaptive classroom behaviors of the subject.

Limitations

The study was limited to investigating the behaviors of a six year old boy enrolled in the Experimental Kindergarten at the University of North Carolina, Greensboro and his peer group of 14 children ages four to six years. The use of single subject design implicitly limits generalization. However, precedence has been set for use of this design by many studies in which modifying individual behavior problems was the concern (Allen, Hart, Buell, Harris & Wolf, 1965; Broden, Bruce, Mitchell, Carter & Hall, 1970; Buell, Stoddard, Harris & Baer, 1968; Hall, Axelrod, Tyler, Grief, Jones & Robertson, 1970; Harris, Johnston, Kelley & Wolf, 1964; Hart, Allen, Buell, Harris & Wolf, 1964; Patterson, 1965, 1969).

Definitions

For the purpose of clarification, the following terms are defined:[1]

1. Respondent conditioning -- behavior change produced by repeated presentation of a neutral stimulus at about the same time as an eliciting stimulus such that the neutral stimulus acquires the power to elicit the respondent behavior; relexive behavior or innate behaviors regularly elicited by

---

[1] Definitions 1-17 are taken from G. S. Reynolds, A primer in operant conditioning. Glenville, Ill.: Scott Foresman & Company, 1968. Pp. 6-12.

specific stimuli which precede them and are largely unaffected by stimuli which follow them. The frequency of respondent behavior is determined by the frequency of the eliciting stimulus.

2. Operant conditioning -- behavior change produced by repeated presentation of a stimulus event immediately following an emitted behavior. Operants are emitted behaviors, acting upon the environment that produces consequences which feed back into the organism and determine the future probability of behavior. The frequency of an operant is determined by the schedule of reinforcement (See Definition 17).

3. Reinforcement -- any event or consequence which, when presented contingent upon a response, has the effect of increasing the future probability of that response.

4. Positive reinforcer -- a stimulus event which reinforces by its appearance.

5. Negative reinforcer -- an event which reinforces by its disappearance.

6. Differential reinforcer -- reinforcement given for certain properties of a behavior and not for other properties.

7. Operant discrimination -- the occurrance of an operant in the presence of certain environmental events or properties thereof (discriminitive stimuli) and not in the presence of others. Discrimination occurs as a result of differential reinforcement.

8. Primary reinforcers -- events which reinforce behavior unrelated to any prior experience with them: food, water, etc.; unconditioned reinforcers.

9. Conditioned reinforcers -- events which acquire the power to reinforce behavior.

10. Generalized reinforcers -- conditioned reinforcers based on several different primary reinforcers and therefore less dependent for their effectiveness upon drive operations appropriate to any one primary reinforcer than upon conditioned reinforcers based on only a single primary reinforcer.

11. Non-social reinforcers -- reinforcers including primary reinforcers and generalized reinforcers such as toys, chips, special privileges, and token reinforcers.

12. Token reinforcers -- conditioned reinforcers such as coins, chips, or points which may be accumulated and later exchanged for other reinforcers.

13. Consummable reinforcers -- reinforcers which may be consumed such as candy and cookies.

14. Social reinforcers -- conditioned reinforcers including attention, approval, and affection.

15. Punishment -- the weakening of an operant by presentation of an aversive consequence.

16. Extinction -- the weakening of an operant by witholding reinforcement.

17. Schedule -- the rate at which and the pattern by which reinforcers are dispensed. It may be continuous or

intermittent; an intermittent schedule may be on an interval or a ratio basis.

18. Contingency -- the dependent relation between an operant and its consequence. Operants that consistently receive the same consequences will be conditioned. Behaviors that receive consequences inconsistently are left to chance.

19. Target behaviors -- specific behaviors which a treatment program is attempting to modify.

20. Baseline -- rate of occurrence of target behaviors before treatment conditions are begun.

21. Reversal design -- an experimental design which includes baseline, treatment condition, withdrawal of treatment (reversal), and reinstatement of treatment condition.

22. Multiple baseline -- an experimental design which includes baseline, two or more successive treatment conditions, and perhaps a reversal and reinstatement of treatment conditions.

CHAPTER II

REVIEW OF LITERATURE

Social and Non-social Reinforcement

Much of the applied research on reinforcement theory to child behavior problems has investigated extensively the use of non-social or tangible reinforcers, both primary or consummable-type reinforcers (Patterson, 1965, 1969) and token reinforcers (O'Leary & Becker, 1967; Martin & Powers, 1967; Walker & Buckley, 1968; O'Leary, Evans, Becker & Saudergas, 1969; Patterson, 1969; Hall, Cristler, Cranston & Tucker, 1970; Schwartz & Hawkins, 1970; McLaughlin & Malaby, 1972). Efforts have been made to use more natural types of non-social reinforcers, such as special privileges, contingent upon appropriate classroom behaviors (Barrish, Saunders & Wolf, 1969).

Other attempts at correcting deviant behavior have utilized discrimination training techniques with Ss followed by, again, dispensation of non-social reinforcers for appropriate responses. Walker and Buckley (1972) devised a program in which S discriminated appropriate and inappropriate behaviors through use of a two-light signal device. However, it was likely that the lights had become conditioned reinforcing stimuli since they also meant that S was earning points. In another study, Patterson (1965 a) used one light

as a discriminative stimulus to reduce hyperactive behavior in a nine year old boy. The S was also given a check list by which to discriminate and label appropriate behaviors among his classmates. However, Patterson pointed out it was not clear which contingency was the controlling event: non-social rewards, peer reinforcement, or discrimination training. Other studies (Patterson, 1969; Packard, 1970) have not been able to ascertain whether the stimulus presented was discriminative, reinforcing, or aversive.

The effectiveness of both social and non-social reinforcers has been studied, either by use of a reversal design using only one type of reinforcer, or a multiple baseline design using both types. In the latter approach, reinforcers may be introduced separately and/or in combination across conditions. Clearly, there are several advantages in using social reinforcers. They are less subject to satiation; they can be dispensed at a distance whereas non-social reinforcers require agent to be in close proximity to S; and non-social reinforcers become unwieldy since the dispenser must keep them on hand. However, research findings have not clearly established the effectiveness of one over the other. O'Leary, et al. (1969) found that token reinforcers were more effective for some children than for others. Walker, Mattson, and Buckley (1971) found that social reinforcers provided greater control of behavior among fourth, fifth, and sixth graders than did token

reinforcers. Nevertheless, recent investigations have begun to show the importance of social reinforcers as being a necessary adjunct in a treatment program using non-social reinforcers if the program is to be successful. When Phillips, Phillips, Fixsen and Wolf (1973) attempted to replicate a successful treatment program for delinquent boys featuring a token economy, it failed badly. Tokens were dispensed by teaching-parents, and the researchers discovered it was the social interaction between the teaching-parents and the adolescents they were serving that had suffered. The interaction pattern had not previously been analyzed, and therefore, was overlooked in the replicated program. In the original model, interaction was generally positive, even for small units of behavior, and social reinforcers were always administered along with the tokens. Analysis of the second program revealed that the adult social reinforcement tended to be negative and critical. Tokens were dispensed without praise. In addition, Wolf suggested in an interview (Goodall, 1973) that praise is a complex event. Praise with specific instruction is more effective than simple praise. Thus, telling a child exactly what he did right, such as "I like the way you piled up the leaves" is preferable to "You did a good job" or "You're a good girl."

For the reasons cited above, then, non-social reinforcers are not as manageable as social reinforcers.

However, in some cases it has been necessary to give tangible reinforcers initially to reduce a high rate of deviant behavior because it was not reinforcing for the agent to dispense social reinforcers. (It is important to remember that the child's behavior is a consequence for the adult, which may, in effect, be punishing to the adult, resulting in the adult not giving out any more social reinforcers. For example, a parent tells a child "in a nice way" to put his toys away so the family can have dinner. When the child does not respond after several statements from the parent, his behavior has become a consequence which in effect punishes the parent's socially reinforcing behavior and may produce punishing behavior in the parent such as a slap or a strong verbal reprimand.) Thus, as reduction of the maladaptive behaviors becomes a reinforcing stimulus for the agent, social reinforcers could be paired with the non-social reinforcers which were eventually faded out (Patterson, et al., 1967). However, an additional problem relative to the fading out procedures of non-social reinforcers is that they be carried out gradually and systematically for maintenance of the new behavior to occur (O'Leary, et al., 1969; Walker, et al., 1971; Walker and Buckley, 1972; Phillips, et al., 1973). That is, abrupt withdrawal of treatment increases the probability of extinction of the new behavior. Another conclusion reached by Zimmerman, Zimmerman and Russell (unpublished) was that token economies tend

to be prosthetic rather than therapeutic. That is, they show changes only during treatment conditions; removal of the contingencies results in loss of treatment effects and, therefore, they do not generalize to otner situations and over time.

Other factors may account for the strength of social reinforcers. Some studies suggest that prior experience is an important variable. Erickson (1962) found that social deprivation enhanced the effectiveness of a social reinforcer but not a tangible reinforcer among sixth grade children in a verbal conditioning experiment. Hartup (1958) and Gewirtz and Baer (1958 a & b) also found that pre-school children who were deprived of interaction with an adult prior to a task performance did better in a socially reinforcing situation than children who had experienced interaction. Other investigations related additional factors such as age of the child (Gewirtz & Baer, 1958a; Stevenson, 1961; Horowitz, 1963; Hartup, 1964; Patterson & Anderson, 1964), sex of the reinforcing agent (Gewirtz & Baer, 1958a; Stevenson, 1961; Horowitz, 1963), and dependency (Hartup, 1958; Endsley & Hartup, 1960) to the effectiveness of social reinforcers. A major finding of those studies which investigated the age factor was that the older children were more responsive to social reinforcers than younger ones.

In further support of the value of social reinforcers, Patterson (1971) contended that when a child displays

deviant behaviors, it is the social environment of the child that is "providing positive social reinforcers contingent upon deviant child behaviors that are sufficient to maintain these behaviors (p. 752)." Much research in this area has focused on adult attention as a reinforcement variable. Many studies have supported the hypothesis that adults differentially attend to antisocial behaviors while ignoring adaptive ones (Hawkins, et al., 1966; Patterson, et al., 1967; Bernal, Duryee, Pruett & Burns, 1968; Patterson, Ray & Shaw, 1968; Patterson, 1969, 1971; Solomon & Wahler, 1973.) An important part of the problem has been that adults make the mistake believing that reprimands and similar statements and other apparent forms of punishment weaken inappropriate behaviors. Research has shown that just the opposite may occur. Reprimands may be in fact a form of attention and, therefore, reinforce rather than extinguish behavior (Becker, Englemann & Thomas, 1971).

Another related aspect of the problem of adults reinforcing maladaptive behaviors is the necessity of establishing a contingent relationship between a behavior and its consequence. If the consequence is given non-contingently or arbitrarily or even long after the behavior has occurred, the behavior is left to chance. Nevertheless, it has been successfully demonstrated that teachers and parents can be trained to strengthen pro-social

behaviors through contingent dispensation of social reinforcers immediately whenever the appropriate behaviors occurred. Typical child behavior problems which have been modified by the use of social reinforcers include attention to learning tasks (Allen, Henke, Harris, Baer & Reynolds, 1967; Ward & Baker, 1968; Broden, et al., 1970; Hall, Lund & Jackson, 1968); cooperative play (Allen, et al., 1965; Buell, et al., 1968); crawling (Harris, et al., 1964); crying (Hart, et al., 1964); general classroom control (Madsen, Becker & Thomas, 1968; Cooper, Thomson & Baer, 1970); and disruptive behaviors in the home (Patterson, et al., 1967; Herbert & Baer, 1972). Teachers' instructions for controlling classroom behavior have been shown not to be very effective (Packard, 1970; Ramp, Ulrich & Delaney, 1971); but when teacher attention was made contingent upon following instructions among kindergarten children, there was a significant improvement in behavior (Schutte & Hopkins, 1970).

Despite the fact that manipulation of adult reinforcement contingencies has produced desirable behavioral changes in many children, for some children, adult attention and approval are not reinforcing (Stevenson & Fahel, 1961; Harris, Wolf & Baer, 1964; Birnbauer, Wolf, Kidder & Tague, 1965; Patterson, et al., 1967; O'Leary, et al., 1969; Zimmerman, Zimmerman & Russell, 1969). As one group of researchers discovered (Scott, Burton & Yarrow, 1967),

controlling one source of reinforcement may be cancelled out by other reinforcement variables not under the modifier's control. Consequences from other sources given inconsistently such as smiling, nodding, or attending the deviant behavior can weaken the effect of any intervention program. It is the peer group of the child that is a source of such reinforcement which can interfere with treatment programs relying solely on the adult as the behavior modifier (Patterson, 1971).

Peer Reinforcement

Several studies have shown that the peer group may reinforce deviant behavior. Peer group attention to or approval of deviant acts may serve both as a reinforcing event and a discriminitive stimulus to which a child responds, followed by more peer reinforcement. In an analysis of interpersonal communication among adolescent delinquent girls, Buehler, Patterson and Furness (1966) found that peer behavior reinforced deviant behavior significantly more often than it punished it. Socially conforming behavior was punished significantly more often than it was rewarded. Parallel findings from Wahler (1967) showed that normal pre-school children attended to and, thus, reinforced deviant behavior during baseline conditions; and from Solomon and Wahler (1973), elementary school children directed their attention exclusively to problem behaviors during baseline conditions.

Two of the earliest studies on the manipulation of peers as reinforcing agents were carried out in laboratory settings. Peer reinforcement was investigated as a function of friendship status and age (Hartup, 1964; Patterson & Anderson, 1964). Patterson and Anderson also considered the sex of the child. Results from the two studies were somewhat conflicting. Hartup's four and five year old children were instructed to give verbal approval to either a "liked" peer or a "disliked" peer during a marble game. The rate of marble dropping was maintained to a greater degree when the reinforcing agent was a disliked peer for both age groups, a result opposite of that expected. The five year old group, however, showed a higher rate of marble dropping overall than did the four year old group, a result that was expected. In Patterson and Anderson's experiment, elementary school children, seven to ten years old, were instructed to give approval to preferred and non-preferred peers during a marble game. Again, as expected, older children increased hole-preference behavior (but not response rate). However, more changes occurred in choice behavior when the reinforcing agent was a friend rather than a non-preferred peer, except the fourth grade children whose choice behavior was reinforced by non-preferred peers. There was no difference in performance between boys and girls.

In explaining his unexpected findings, Hartup speculated that bids for attention from "friend" interfered with the response rate, or that "talkers" had a greater capacity for eliciting interfering responses in the "liked" peer. Further, he concluded that the age difference decrement may have been due to less incentive value of social reinforcers for four years old, or possibly to boredom or fatigue. In addition, he attributed the conflicting results between his study and Patterson and Anderson's to differences in methodology and, therefore, cautioned careful interpretation. Patterson and Anderson were not able to explain why the fourth graders performed better with non-preferred peers whereas the second and fifth graders performed according to expectation.

The authors pointed out, however, an important aspect of peer behavior that would presumably have a bearing on whether the peer group contingencies for individual behavior could be manipulated. That is, children elicit social reinforcers from adults for behavior corresponding to adults' value of "good" behavior; but behavior which elicits responses from the peer group is probably quite different. Thus, it may be assumed that behaviors "valued" by the peer group are behaviors most likely "...to elicit social reinforcers from the peer. After extended experience with the peer group, the child who is more responsive to social reinforcers from the peer

group would be expected to show a higher frequency of behaviors valued by this group (p. 952)." Therefore, if the peer group values behavior not congruent with that which the teacher values, the behavior modifier must first strengthen the congruency between the teachers' value and the peer group's value of appropriate behavior.

As a result of the increasing awareness of the importance of peer group behavior, there have been some attempts to manipulate it in more natural settings, but in an indirect manner. Several studies have employed group contingencies for individual problem behavior, almost invariably through adult dispensation of non-social reinforcers. However, such programs have either failed to show the effect of the peer group or failed to analyze it. Patterson (1965) believed the peer group undoubtedly played an important role in modifying the behavior of a hyperactive boy. Patterson and Brodsky (1966) attempted to modify the aggressive behavior of a five year old boy through a point system applied to the boy and his peer group whenever non-aggressive interaction by either party occurred. However, the causal roles of peer behavior and the adult-controlled point system were confounded. Barrish, et al., (1969) showed that when the consequences for individual behavior were shared by the group, behavior improved. Medland and Stachnik (1972) replicated this study with similar results, suggesting that the target behaviors

came under the control of "extra-experimental reinforcement" or "coincidental contingencies encountered enroute (p. 50)." Similar results using group contingencies for classroom behavior problems have been reported by Bushell, Wroebel and Michaelis (1968) for pre-schoolers and by Schmidt and Ulrich (1969) for fourth graders.

Thus far, the specific use of peer reinforcement as a treatment variable has only been suggested. Two studies attempted to train a single peer to dispense non-social reinforcers. Patterson, Shaw and Ebner (1969) instructed a second grade boy to dispense points and social approval following classroom work behavior of an inattentive child. Surratt, Ulrich and Hawkins (1969) showed than an elementary student could effectively increase study behavior of younger children through monitoring and distributing non-social reinforcers. Again, however, it was difficult to determine which aspect produced the behavioral change. Finally, Packard (1970) was able to increase attending behaviors of children in kindergarten, third, fifth, and sixth grade by arranging consequences for the entire group. Although peer behavior as a source of control was not analyzed, the author stated that peer interaction of this type was considerable. Packard further suggested that "a program of reinforcing attention would be proportionately enhanced by making peer approval or disapproval contingent on a student's attention to task, and ... be of great value to education (p. 26)."

More recently, attempts have been initiated to investigate whether peer-dispensed social reinforcement can be manipulated to control problem classroom behavior. Wahler (1967) randomly selected five normal pre-school children and their peers. Under a free play setting, one group of peers was instructed by E to ignore S when a particular class of behaviors, pre-determined as "high rate," was emitted. Another group was instructed to ignore all of Ss behavior except for a particular class, pre-determined as a "low rate." Results showed that instruction only from E to the peer group to differentially attend a variety of social behaviors could teach the peer group to control child behaviors in a naturalistic setting. Walker and Buckley (1972) concluded "peer reprogramming" was a powerful technique in behavior maintenance after treatment in a token economy for elementary school children. However, it was not clear whether the behavior maintenance was actually due to differential attention supplied by the peers, to non-social reinforcement provided as a group contingency, or to a cost-response contingency associated with the treatment. However, in terms of time invested in the various treatment conditions, peer reprogramming required significantly less time compared to teacher training, and yet produced the greatest behavioral maintenance.

A very recent investigation into peer behavior was conducted by Solomon and Wahler (1973). The authors set out to see if a child's peer group contributed to the maintenance of deviant behavior, and if their reinforcement could be controlled by adults to produce changes in the problem behavior of particular children. They found that during baseline conditions, sixth grade children attended exclusively to problem behavior. Five children were then selected for taining on the basis of the teacher's rank ordering for their "willingness to cooperate with adults." Each child was instructed how to apply differential reinforcement and extinction concepts. To learn discrimination of problem and desirable behaviors, students practiced spotting the behaviors from a video tape. During the actual sessions, each peer kept a record of his responses to problem and desirable behaviors. At the end of each day, the teacher would discuss their records with them. Results indicated problem behaviors decreased overall and for each subject as well. Attention from the control peers was contingent on desirable behavior whereas social attention from other peers remained exclusively directed at problem behaviors. However, while the control peers substantially decreased their attention to problem behaviors, there was only a small increase in their giving approval for desirable behaviors. Thus, apparently, while the peer group succeeded in altering attending and ignoring behaviors,

dispensing approval was not well established. In terms of reinforcement theory, reinforcers for the peer group to give approval were not strong enough.

Some of the problems in utilizing the peer group as a treatment agent needing further investigation include sifting out confounding variables of non-social and social reinforcers, peer and adult dispensation of consequences, and discriminitive stimuli. Since previous research indicated that some children are very responsive to adult reinforcement and others are not, it would seem that teacher reinforcement might function as a strong reinforcer for peer behavior to modify individual problem behaviors. Finally, in view of the findings of Gewirtz and Baer (1958a), Stevenson (1967), Horowitz (1963), Hartup (1964), and Patterson and Anderson (1964) that younger children are not as responsive to social stimuli, a problem would be to determine whether or not pre-school children, age four, five, and six, can be trained to dispense social reinforcers without benefit of back-up reinforcers.

CHAPTER III

METHOD

Subjects and Agents

The subject of the present study was a six year old boy whose behavior problems had been the object of various contingency management programs during his two year stay in the Experimental Kindergarten at the University of North Carolina at Greensboro. S lived with his grandparents; although they had an income in a low-middle range, they were able to provide many learning and play materials for him. They were concerned about S's behavior and progress in the kindergarten, particularly the grandmother who often discussed with the teacher problems they had with S at home as well as at school. Intelligence test scores revealed S fell in the dull-normal range. Thus, because of the low rate of success of previous behavior modification programs, S was recommended for a developmental evaluation. Preliminary results indicated there might be some organic disorder related to the behavior problems. Typically, previous reports based on actual data collected showed that S displayed a high rate of verbal and physical abuse of peers, hyperactivity and the inability to sit still for more than a few minutes at a time, and negativity toward adult requests. He was adept at large motor skills, but,

at the time of the present study, he had difficulty and became frustrated easily with small motor skills such as cutting with scissors and using pencils and crayons. In addition, he would confuse cause-effect relationships, for example, "The sun is out because it is raining," or he would make absurd remarks. S could be very affectionate and, in general, responded to social reinforcers from his peers, and to a lesser extent, from teachers. Tangible reinforcers from adults had been effective in previous treatment programs where the emphasis had been to manipulate adult reinforcement contingencies. However, behavior improved only for as long as the program was in effect and quickly reversed when reinforcers were withdrawn or not consistently dispensed.

The reinforcing agents in the present study were 14 peers, ranging in age from four to six years, also enrolled in the University's Experimental Kindergarten. They had normal to above average intelligence, and all had college educated parents.

Setting

All data were collected during each of two daily periods of time at 9:00 a.m. and 11:30 a.m. (As data were being processed throughout the experiment, the author-teacher suspected that the variability in both S's and P's behavior between the early morning session and the late morning session obscured treatment effects to the point

that from the late morning sessions data were rendered unusable. Historically, the children's behavior came under the control of the experimental stimuli related to lunch-time preparation. The obvious stimuli of food itself and the activity of peers who were helping with the preparations, were likely events contributing to the variability of the entire group's behavior. Consequently, these data were not included in the analysis.) These time periods were always set aside for large group activity, and S's problem behaviors were particularly evident then. The teacher led a quiet group activity such as reading a story or finger play which provided enough structure to maximize teacher control of the group. The area of the room used for the experiment had a rug on which the children sat, a piano and bench on one side of which the children sat as the teacher carried out the program, and a chalkboard.

Dependent Measures

On the basis of numerous prior observations of S, the author formulated three classes of S's behavior as follows:

Appropriate motor and verbal (No). This was coded for all appropriate or adaptive motor and verbal behaviors. Appropriate motor behavior included positive physical contacts with adults and peers such as giving hugs, pats, or arm around the shoulder; doing whatever the teacher-directed

activity required such as looking at a book, making finger plays, listening, following instructions, raising his hand to volunteer answers or information or to ask permission. Appropriate verbal behavior included talking with permission, talking or singing in a normally amplified voice, making positive social verbalizations including "please," "thank you," "I'm sorry," other social reinforcing verbalizations, or neutral responses which were not aggressive in nature.

Inappropriate motor (Ai). This was coded for negative physical contacts including poking, tickling, pinching, biting, hitting, kicking, tripping, shoving, or attempts to do any of these; or for non-attention to the story or group activity for approximately five seconds or more. Non-attention included looking about the room; watching observer or other children or adults; turning around; deliberately blocking view of another child; playing with a toy; or moving about the room.

Inappropriate verbal (Vi). This was coded whenever S talked, sang loudly, shouted or made absurd, threatening, bossy, teasing or hostile remarks; interrupted someone; for negativity (inappropriate denial following a reasonable request); and for modeling improper verbal behavior of another child. Examples of absurd speech include: "You can eat a washing machine." "You can wash a hamburger." Examples of hostile or threatening speech were: "dumb-dumb,"

"stupid," "I'm going to hit you," "You can't have ..." or "You can't come to my party," and "I hate you." Examples of teasing were: "My shirt is prettier than yours," or "You have a doo-doo in your pants."

In addition two categories were adopted from Walker and Buckley (1972). Initiation to peer (IP) was coded when subject talked to or in some way tried for attention of peer. Peer initiation to S (PI) was coded whenever peer talked to, poked, or in some way tried for attention of S.

Teacher reinforcement. Another dependent variable was teacher reinforcement, which was not given a frequency count. This consisted of the teacher giving social reinforcers for appropriate peer responses to S's behavior such as "I'm glad you told K he is listening nicely to the story."

Independent Measures

Six categories of peer behavior were formulated as encompassing all types of social reinforcement to S.

No response (O). This was coded when no response from peers followed a behavior.

Attention (At). This was coded whenever peers looked at behaving S. It was a neutral kind of response with no obvious approval or disapproval in the attending response.

Approval (Ap). This was coded whenever S received praise or an approving statement from peer. It may have

been verbal or consisted of gestures such as smiles, nods, applause, or laughter.

Disapproval (D). This was coded whenever S's behavior was followed by verbal or gestural disapproval from peer including frowning, negative head nods, or statements such as "You shouldn't have done that."

Physical contact positive (Pc+). This was coded when S's behavior was followed by peer's hugs, pats, or arm around the shoulder.

Physical contact negative (Pc-). This was coded when S's behavior was followed by aggressive behavior from peer such as hitting, pushing, or kicking.

Apparatus

Two 25-watt bulbs, one red and one green, served as discriminative stimuli during treatment conditions. The lights were mounted on a strip of plywood and then nailed to the chalkboard wall so they faced the children during group time.

Method of Data Collection

Observation techniques were employed for collecting data. Reliability was checked every fourth observation.

Observation techniques. One observer recorded S's and P's behavior on behavioral rating sheets throughout all phases of the experiment. The rating sheet consisted of a grid divided into 48 15-second intervals each for S and P, with each interval containing the respective behavior

codes. These 48 intervals were arranged in one minute blocks for easier visibility while recording and counting. Each observation session lasted 12 minutes.

The observer used a stop watch to discriminate the time intervals. For each interval, O recorded all behaviors of S and Ps. However, for appropriate verbal and motor behavior to be coded, the behavior had to occur for an entire interval.

Reliability. A second observer was used for a reliability check on every fourth observation. The method for determining inter-rater reliability was the percent agreement method which has been used in several studies (Ramp, Ulrich & Dulaney, 1971; Solomon & Wahler, 1973). The number of agreements was divided by the total number of agreements plus disagreements x 100. Agreements were defined as two observers coding the same behavior codes for S and P in the same interval. Pilot baseline data yielded a reliability coefficient of 0.93.

All observers were undergraduate students in the social sciences, serving as teacher aides in the kindergarten. Those collecting data had had previous experience doing so. The third observer operating the lights was not responsible for collecting any data.

Experimental Design and Procedures

A multiple baseline superimposed on a reversal design having a total of seven conditions was used. The conditions were:

1. Condition 1 -- Baseline
2. Condition 2 -- Instructions only
3. Condition 3 -- Instructions + signal light
4. Condition 4 -- Instructions + signal light + teacher reinforcement
5. Condition 5 -- Reversal 1
6. Condition 6 -- Reinstatement of all contingencies
7. Condition 7 -- Reversal 2

Observers recording the behaviors remained in the room and close by the children during all observations. The observer operating the lights remained behind a 2-way mirror.

At the beginning of each session the teacher signaled the group to sit on the rug. After any instructions about the experiment were given, she began a story. During and after the story, discussion was held. Stories were chosen by the teacher at random and on the basis of what was appealing to the children. The subject was present at all sessions and heard all instructions.

Baseline. When observer reliability had reached an acceptable level during the training sessions, formal baseline was begun. The current classroom procedures of dealing with inappropriate behaviors remained in effect. These included social reinforcement deliberately dispensed by the teacher and incidentally by peers for appropriate behaviors; time-out for five minutes for physical abuse

of peers; and various types of punishment for or ignoring of other inappropriate behaviors.

Instructions Only. When S's inappropriate behaviors showed a continual increase in frequency, the teacher instructed the peer group how to respond to S's deviant or adaptive behaviors. The children were told the following:

> Boys and girls, you remember our special visitor who brought us 'the green circle.' In our kindergarten we have a green circle around us. We can't see it, but we know it is there. Starting today we are going to make the green circle become important to us, and especially to K.
>
> All of us like K very much when he behaves nicely and we want him to like us too. Sometimes K does very nice things like sharing toys, saying he is sorry, and asking nicely for things. And when he does these things, we are going to let him into our green circle.
>
> But sometimes K does things that are not nice at all. Sometimes K doesn't pay attention to stories or follow directions very well; sometimes he starts playing with you, teasing, poking, tickling, or hitting you. Sometimes he walks around the room or moves around during group time when he should be listening; or talking out of turn or interrupting others. And when he does these things, we must leave K out of our circle until he is nice again.
>
> Whenever K is doing something good, you may raise your hand and I will call on one of you to tell K what it is he is doing right. But when K is doing something he shouldn't, then we are just going to pretend he is not even there. We won't look at him or say anything to him. He must remain outside our green circle until he is good again.

Time-out remained in effect for all remaining conditions for any physical abuse of peers.

Instructions + Signal Light. When the data revealed that instructions were having little effect or a negative

effect on the target behaviors and peer reinforcement, the signal light system was introduced to the group along with modified instructions as follows:

> Now everytime K is doing something good, a green light will go on. That will tell you K is doing the right thing. When that happens, I will let one of you raise your hand to tell K exactly what he is doing right. You may say things like, 'K, I like the way you listened to the story,' or 'K, I'm glad you raised your hand and waited to be called on.'
>
> But if K is doing something he shouldn't, the red light will come on. This tells you that you must not pay any attention to K. Do not say a word to him. Don't even look at him.

The observer behind the mirror operated a switch for each light. He was instructed to flip the green light switch whenever S displayed pro-social behaviors for at least five seconds and let it remain on for random lengths of time, which was left to O's discretion. The red light was switched on anytime S displayed deviant behaviors and remained on for the duration of the behavior.

Instructions + Signal Lights + Teacher Reinforcement. The fourth condition was introduced next when it was revealed that the light stimulus was not positively affecting peer reinforcement and only slightly S's target behaviors. Teacher reinforcement was made contingent upon peer approval for S's adaptive behaviors. Each time a peer gave approval, verbal or physical, the teacher gave approval to the peer, such as "I'm glad you noticed K is sitting quietly," or "I'm so glad you are working hard at helping K listen to the story."

When an increase in both pro-social behaviors and peer reinforcement were observed, and, to assess the effect of the fourth condition, reversal to baseline was resumed with the following instructions to the group:

> You have been doing so well praising K for his good behavior, that we don't need the lights anymore. Let's see how well you can do without the lights.

No further instructions were given during this condition. Peer approval responses went unreinforced by T who said, "O.K. Let's get back to the story."

When withdrawal of contingencies resulted in reversal to baseline level, all contingencies were reinstated. When reinstatement of treatment resulted in increased pro-social behaviors and peer approval, a final reversal was resumed.

CHAPTER IV

RESULTS

Presentation of Data

Figures 1 through 6 and Table 1 depict the results of the experiment. Graphs show S's target behaviors and peers' responses by condition. In addition, several peer responses are depicted for differential reinforcement of S's behaviors. Each data point represents the percent of time spent during each session for the target behavior and is based on the frequency of the particular behavior per 48 intervals. The mean frequency ($\bar{X}$%) for each behavior for each condition was also calculated, based on averaging the data points for each condition.

Subject's behaviors. Three of S's behaviors, Appropriate Motor and Verbal, Inappropriate Motor, and Inappropriate Verbal are presented in Figure 1. Appropriate Motor and Verbal behavior (Adaptive) declined during baseline conditions, averaging 25%. During Condition 2, these behaviors more than doubled (58%) on the first session, but declined rapidly to 23%, averaging 44%, nearly twice as frequent as baseline. When the Signal Lights were introduced in Condition 3, Appropriate behavior increased only slightly overall (46%), but with the Teacher Reinforcement contingency added in Condition 4, a substantial increase

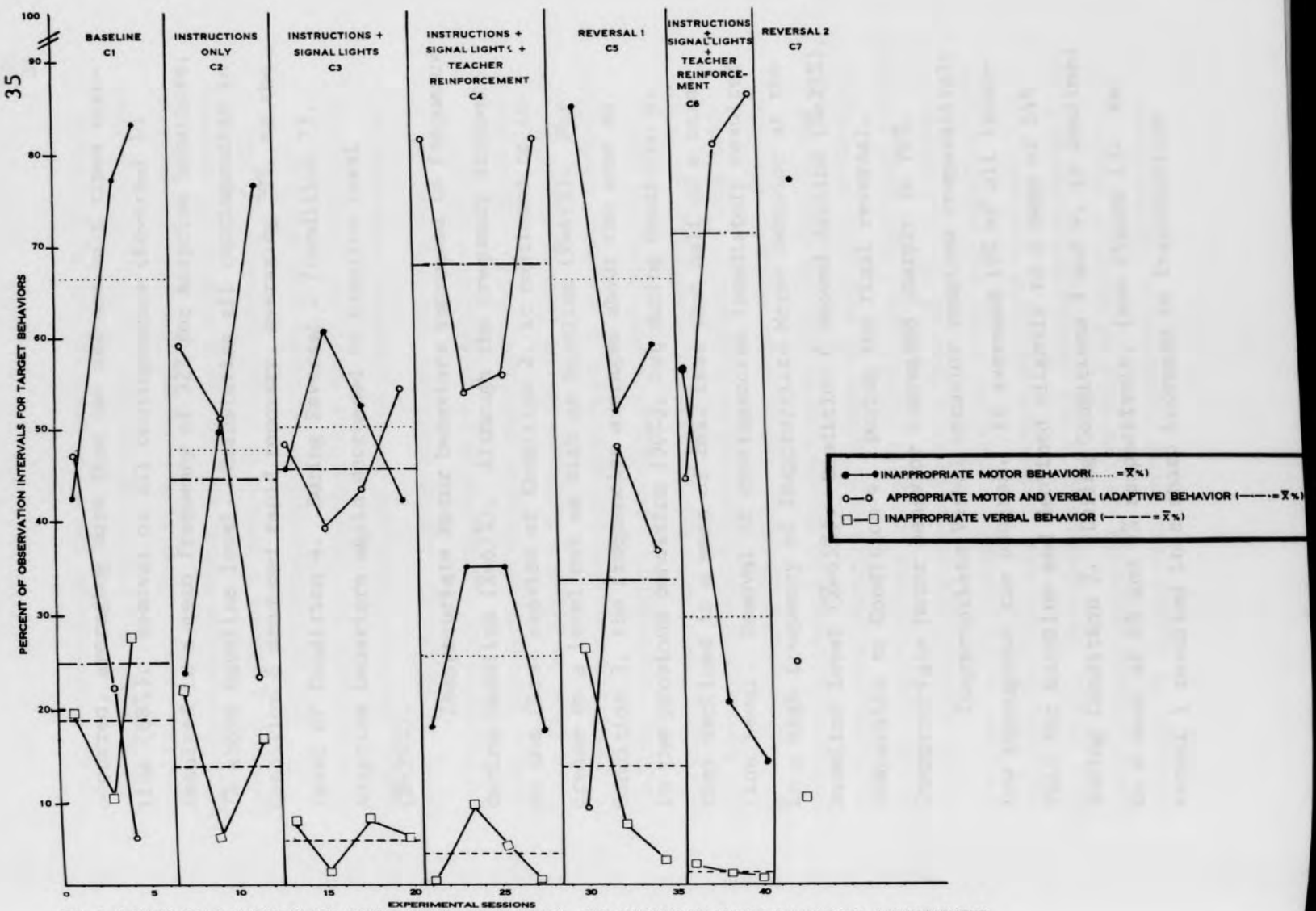

FIG. 1. PERCENT OF S's INAPPROPRIATE MOTOR, INAPPROPRIATE VERBAL, AND ADAPTIVE BEHAVIORS FOR BASELINE AND TREATMENT SESSIONS AND MEAN PERCENT FOR EACH CONDITION.

occurred, averaging more than two and one-half times baseline (68%). Removal of all contingencies (Reversal 1) resulted in a mean frequency of 32% for Adaptive behaviors, 7% above baseline level. Reinstating all contingencies in Condition 6 produced rapid recovery, averaging 70%, to the level of Condition 4. During Reversal 2 (Condition 7), Adaptive behaviors again decreased to baseline level ($\bar{X}$=24%).

Inappropriate Motor behaviors increased in frequency during baseline ($\bar{X}$=67%). Although the frequency dropped on the first session of Condition 2, it continued to increase to a level not as high as baseline ($\bar{X}$=49%). For Condition 3, the frequencies averaged about the same as in the previous condition (50%), but during Condition 4, they declined to a mean of 26%, less than half of a baseline level. Removal of contingencies immediately resulted in a high frequency of Inappropriate Motor behavior at the baseline level ($\bar{X}$=65%). Condition 6 showed decline ($\bar{X}$=28%), comparable to Condition 4. During the final reversal, Inappropriate Motor behavior increased sharply to 76%.

Inappropriate Verbal behavior remained comparatively low throughout the program. It averaged 19% of all intervals for baseline and declined slightly to a mean of 14% during Condition 2. During Conditions 3 and 4, it declined to a mean of 6% and 4% respectively, (see Figure 1). Reversal 1 resulted in a sharp increase to Inappropriate

Verbal behavior, on the first session, but it decreased rapidly over the remaining sessions ($\bar{X}$=13%), 6% less than baseline level. Condition 6 showed the greatest decline of Inappropriate Verbal behavior to a mean of 1%, whereas Reversal 2 showed a return to a mean frequency of 10%.

S's Initiation-to-Peer contacts were analyzed differentially for Inappropriate Motor and Inappropriate Verbal behaviors combined and for Adaptive behaviors as shown in Figure 2. During baseline, the frequency of S's Inappropriate contacts to peers increased ($\bar{X}$=32%), whereas Appropriate contacts declined ($\bar{X}$=1%). Condition 2 resulted in a rapid decrease in the Inappropriate contacts in the first session, but continued to increase thereafter ($\bar{X}$=23%). Appropriate contacts remained about the same, averaging less than 1%. Condition 3 resulted in an overall decrease of the Inappropriate contacts to less than half of baseline ($\bar{X}$=12%). Appropriate contacts overall sessions increased to an average of 4%. In stating all contingencies (Condition 4) showed an even greater decline of the Inappropriate contacts ($\bar{X}$=6%) and a continued increase of the Appropriate contacts to a mean of 7%. Condition 5 resulted in a reversal to baseline level for Inappropriate contacts ($\bar{X}$=32%), and Appropriate contacts declined to a mean of 2%. Reinstatement of all contingencies brought the Inappropriate contacts down to half of baseline level, although 9% higher than under Condition 4. Appropriate

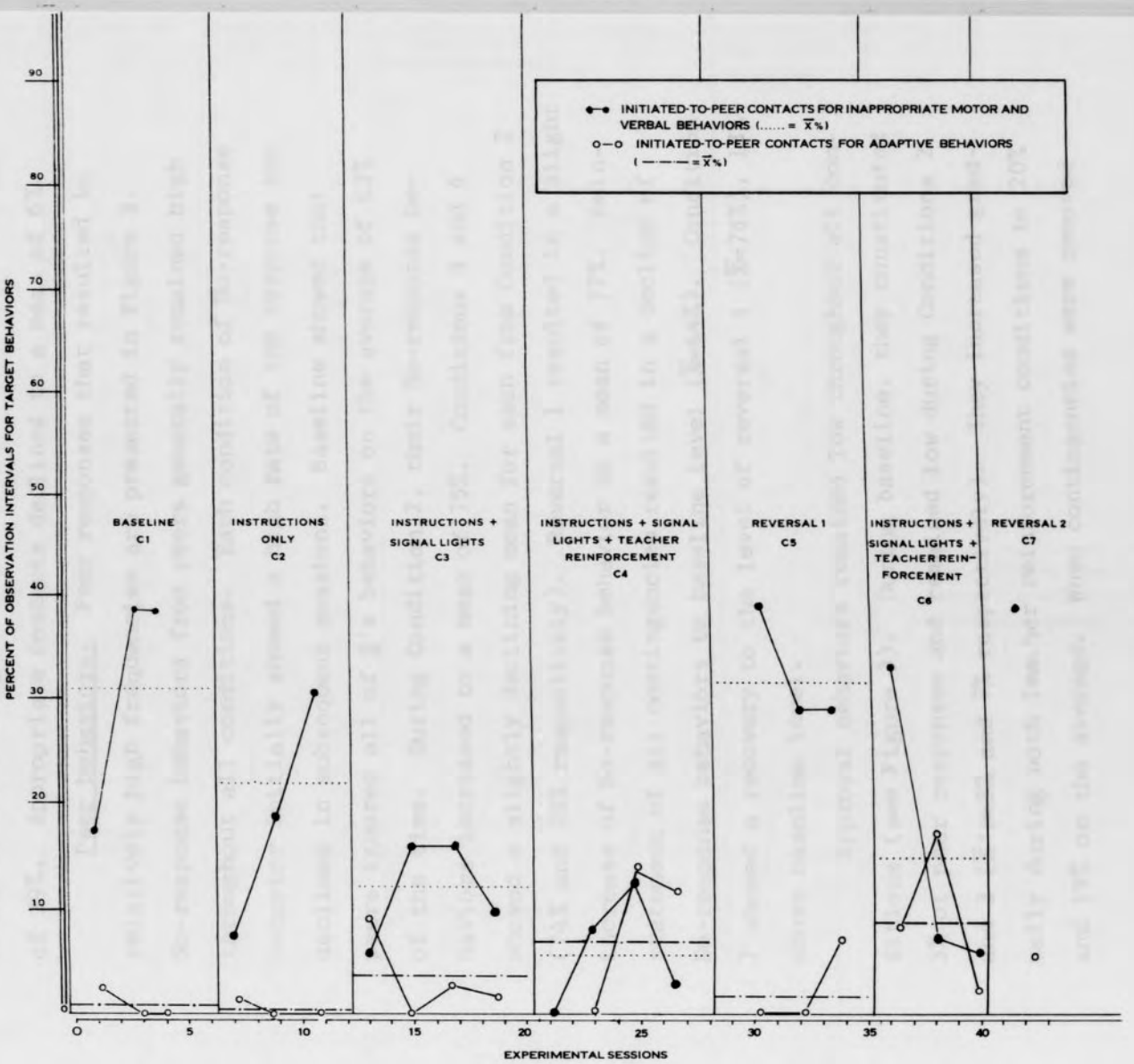

FIG. 2. PERCENT OF S's INITIATED-TO-PEER CONTACTS FOR ADAPTIVE AND INAPPROPRIATE BEHAVIORS FOR EACH SESSION AND MEAN IT PERCENT FOR EACH CONDITION.

contacts increased to 9% on the average, 2% higher than the mean for Condition 4. The frequencies of Inappropriate contacts reversed again in the final condition to a mean of 39%. Appropriate contacts declined to a mean of 6%.

Peer behaviors. Peer responses that resulted in relatively high frequencies are presented in Figure 3. No-response behaviors from peers generally remained high throughout all conditions. Each condition of No-response behavior initially showed a high rate of the response but declined in subsequent sessions. Baseline showed that peers ignored all of S's behaviors on the average of 63% of the time. During Condition 2, their No-response behaviors increased to a mean of 75%. Conditions 3 and 4 showed a slightly declining mean for each from Condition 2 (74% and 70% respectively). Reversal 1 resulted in a slight increase of No-response behavior to a mean of 77%. Reinstatement of all contingencies resulted in a decline of No-response behaviors to baseline level ($\bar{X}$=64%). Condition 7 showed a recovery to the level of reversal 1 ($\bar{X}$=76%), 13% above baseline level.

Approval behaviors remained low throughout all conditions (see Figure 3). During baseline, they constituted 3% of peer responses and remained low during Conditions 2 and 3 ($\bar{X}$'s=3% and 7% respectively). They increased gradually during both Teacher reinforcement conditions to 20% and 19% on the average. When contingencies were removed

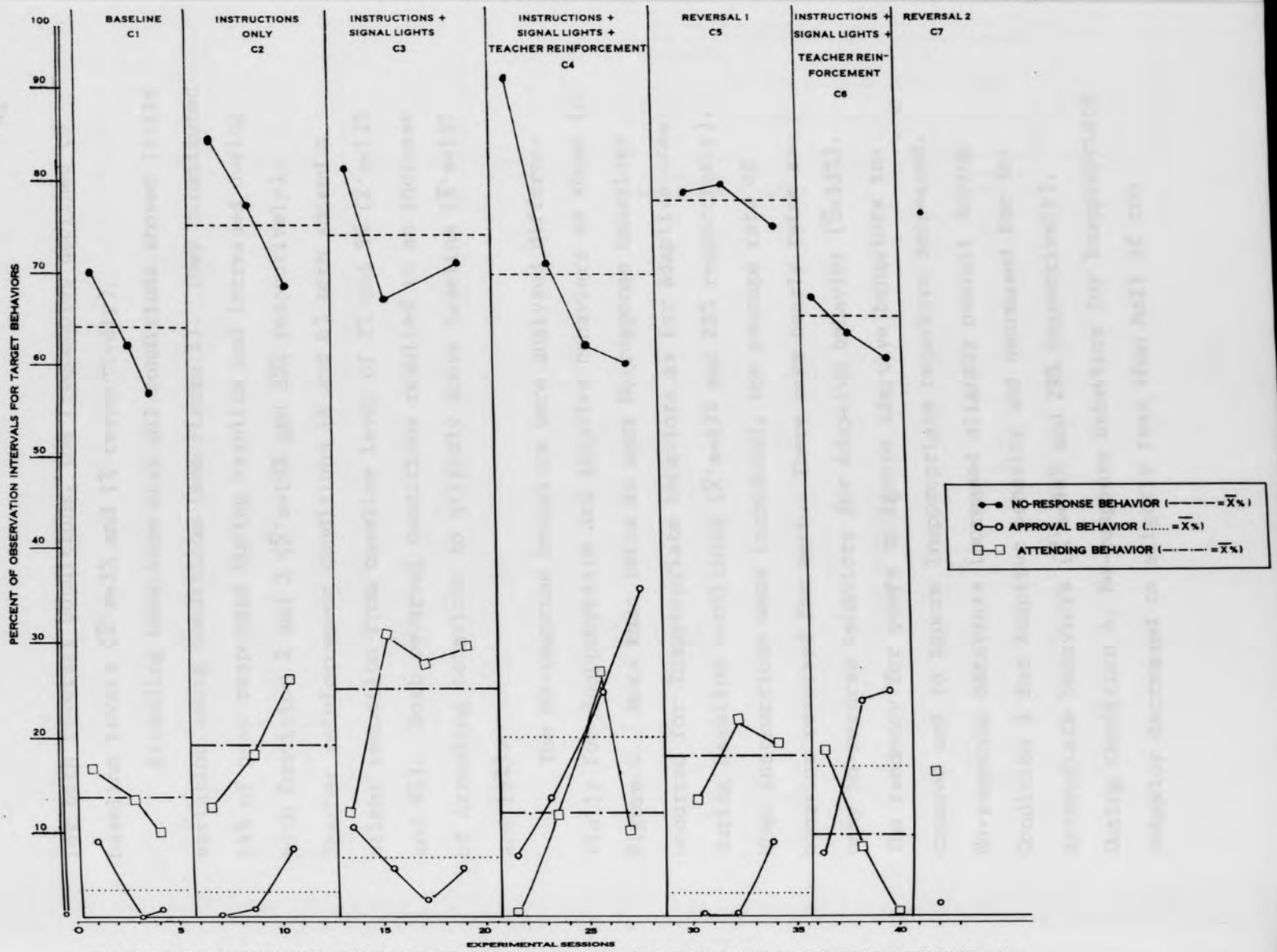

FIG. 3. PERCENT OF PEER RESPONSES FOR NO-RESPONSE, APPROVAL, AND ATTENDING BEHAVIORS FOR EACH SESSION AND MEAN PERCENT FOR EACH CONDITION.

for both reversal conditions, the frequencies declined to baseline levels ($\bar{X}$'s=3% and 1% respectively).

Attending behaviors over all conditions showed little variation among conditions (see Figure 3). They constituted 14% of peer responses during baseline and increased during both Condition 2 and 3 ($\bar{X}$'s=19% and 25% respectively). Teacher reinforcement conditions (4 and 6) both showed a slight reduction from baseline level of 2% and 5% ($\bar{X}$'s=12% and 9%). Both reversal conditions resulted in an increase of Attending behaviors to slightly above baseline ($\bar{X}$'s=18% and 16%).

The No-response behaviors were analyzed differentially for Inappropriate and Adaptive behaviors as shown in Figure 4. More than twice as many No-response behaviors occurred for Inappropriate behaviors as for Adaptive ones during baseline conditions ($\bar{X}$'s=43% and 20% respectively). When Instructions were introduced, the average rate of behavior reversed for each. There were nearly twice as many No-reverse behaviors for Adaptive behavior ($\bar{X}$=33%). The tendency for peers to ignore Adaptive behaviors increased and to ignore Inappropriate behaviors decreased. No-response behaviors increased slightly overall during Condition 3 for Adaptive behavior and decreased for Inappropriate behaviors ($\bar{X}$'s=44% and 29% respectively). During Condition 4, No-response behaviors for Inappropriate behavior decreased to slightly less than half of the

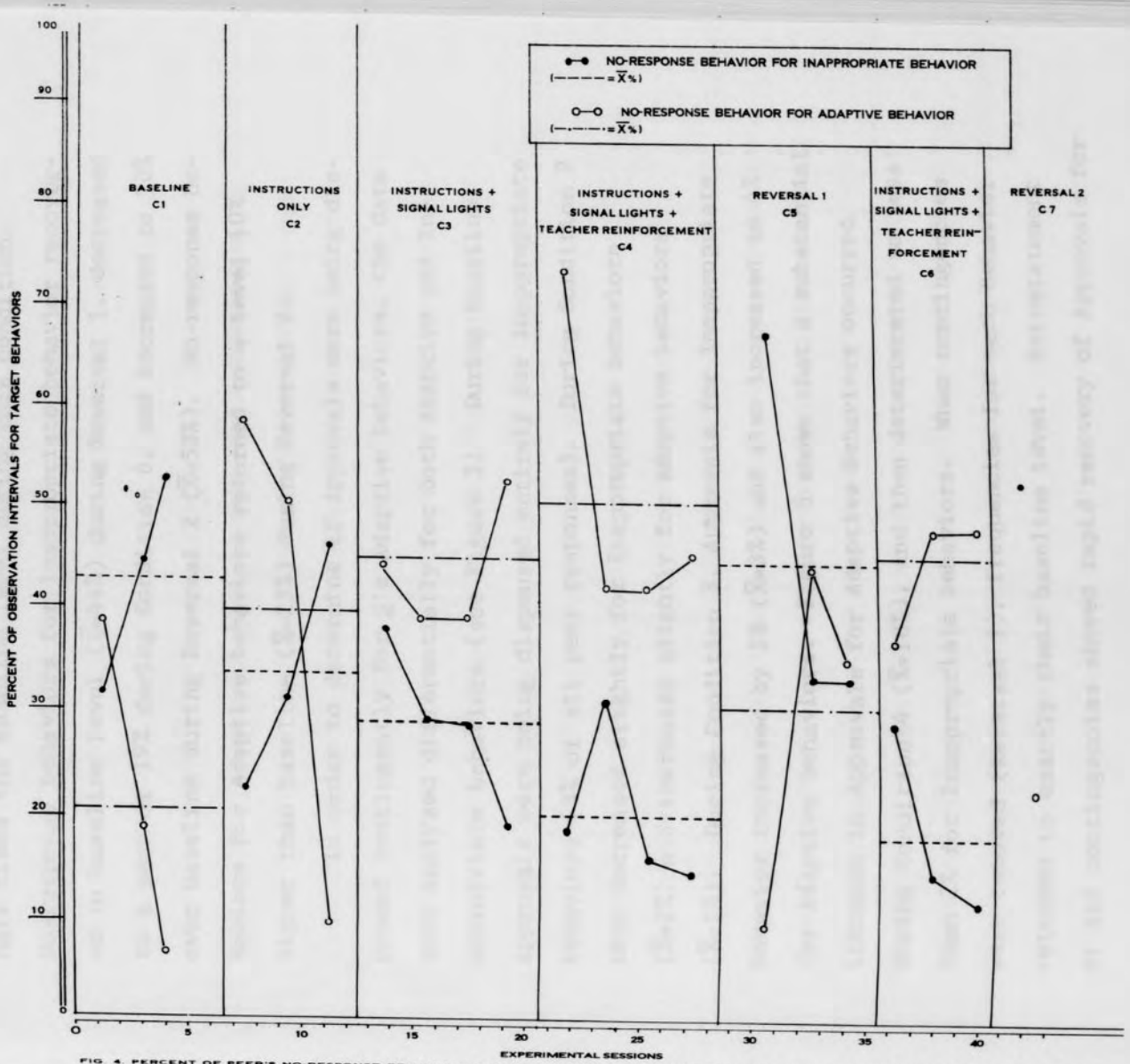

FIG. 4. PERCENT OF PEER'S NO-RESPONSE BEHAVIORS FOR S's ADAPTIVE AND INAPPROPRIATE BEHAVIORS FOR EACH SESSION AND MEAN PERCENT FOR EACH CONDITION.

baseline level ($\bar{X}$=20%). No-response behaviors for Adaptive behavior increased to a mean level of 50%, two and one-half times the baseline level during this condition. No-response behaviors for Inappropriate behavior recovered to baseline level ($\bar{X}$=44%) during Reversal 1, decreased to a mean of 19% during Condition 6, and increased to 10% over baseline during Reversal 2 ($\bar{X}$=53%). No-response behaviors for Adaptive behaviors returned to a level 10% higher than baseline ($\bar{X}$=23%) during Reversal 2.

In order to determine if Approvals were being dispensed contingently for S's Adaptive behaviors, the data were analyzed differentially for both Adaptive and Inappropriate behaviors (see Figure 5). During baseline, Approvals were being dispensed entirely for Inappropriate behaviors (3% of all peer responses). During Condition 2 they decreased slightly for Inappropriate behaviors ($\bar{X}$=2%) and increased slightly for adaptive behaviors ($\bar{X}$=1%). During Condition 3, Approvals for Inappropriate behavior increased by 1% ($\bar{X}$=3%) and also increased to 4% for Adaptive behaviors. Figure 5 shows that a substantial increase in Approvals for Adaptive behaviors occurred during Condition 4 ($\bar{X}$=18%), and then deteriorated to less than 2% for Inappropriate behaviors. When contingencies were removed (Reversal 1), frequencies for each behavior returned to exactly their baseline level. Reinstatement of all contingencies showed rapid recovery of Approvals for

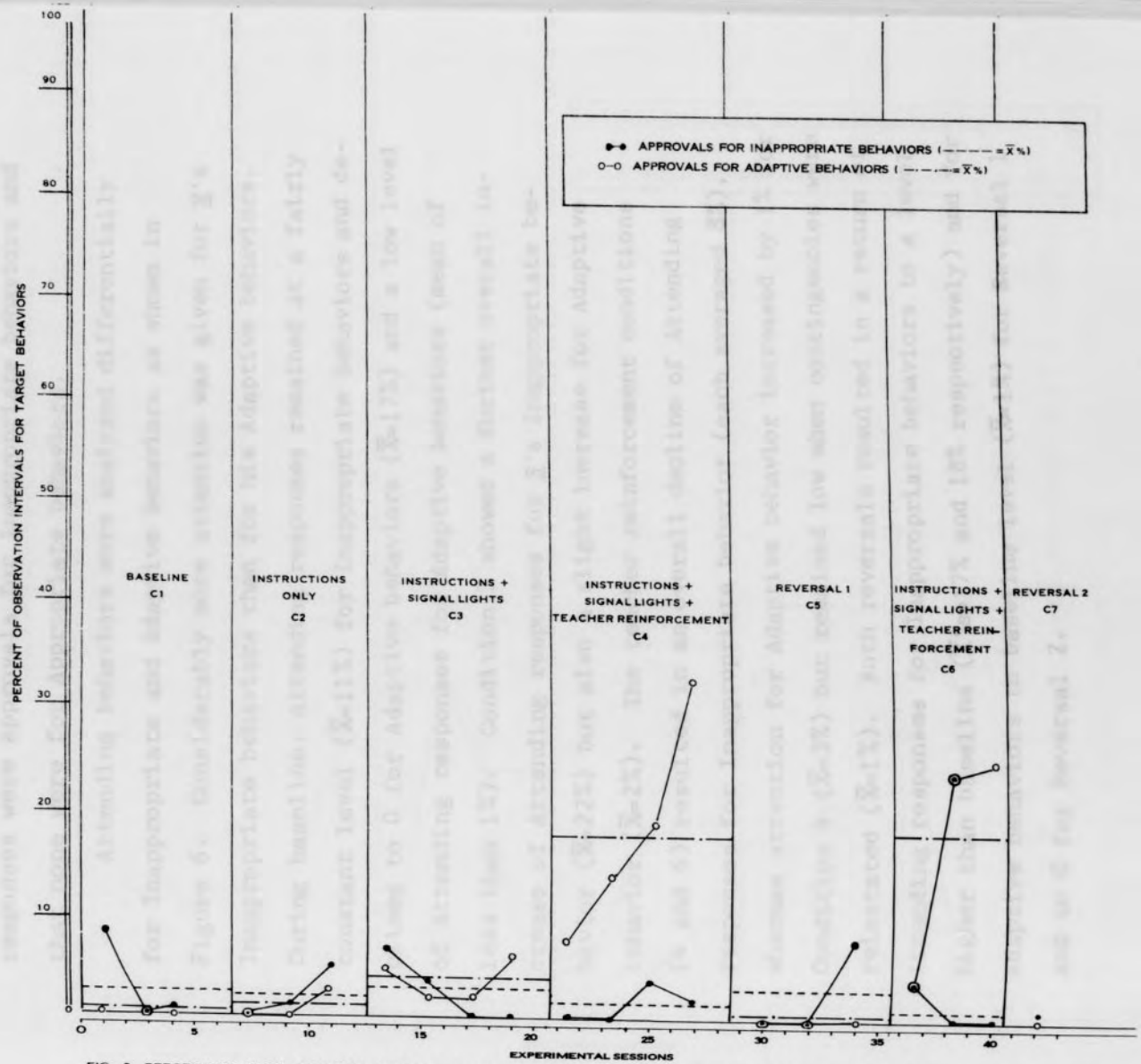

FIG. 5 PERCENT OF PEER APPROVAL RESPONSES FOR Ss ADAPTIVE AND INAPPROPRIATE BEHAVIORS FOR EACH SESSION AND MEAN PERCENT FOR EACH CONDITION

Adaptive behaviors ($\bar{X}$=18%) and a decrease to 1% for Inappropriate behaviors. Reversal 2 showed that 1% of all responses were Approvals for Inappropriate behaviors and that none were for Appropriate behaviors.

Attending behaviors were analyzed differentially for Inappropriate and Adaptive behaviors as shown in Figure 6. Considerably more attention was given for S's Inappropriate behaviors than for his Adaptive behaviors. During baseline, Attending responses remained at a fairly constant level ($\bar{X}$=11%) for Inappropriate behaviors and declined to 0 for Adaptive behaviors ($\bar{X}$=17%) and a low level of Attending responses for Adaptive behaviors (mean of less than 1%). Condition 3 showed a further overall increase of Attending responses for S's Inappropriate behavior ($\bar{X}$=22%) but also a slight increase for Adaptive behavior ($\bar{X}$=2%). The teacher reinforcement conditions (4 and 6) resulted in an overall decline of Attending responses for Inappropriate behavior (each averaged 8%), whereas attention for Adaptive behavior increased by 1% for Condition 4 ($\bar{X}$=3%) but remained low when contingencies were reinstated ($\bar{X}$=1%). Both reversals resulted in a return of Attending responses for Inappropriate behaviors to a level higher than baseline ($\bar{X}$'s=17% and 18% respectively) and for Adaptive behaviors to baseline level ($\bar{X}$=1%) for Reversal 1 and to 0 for Reversal 2.

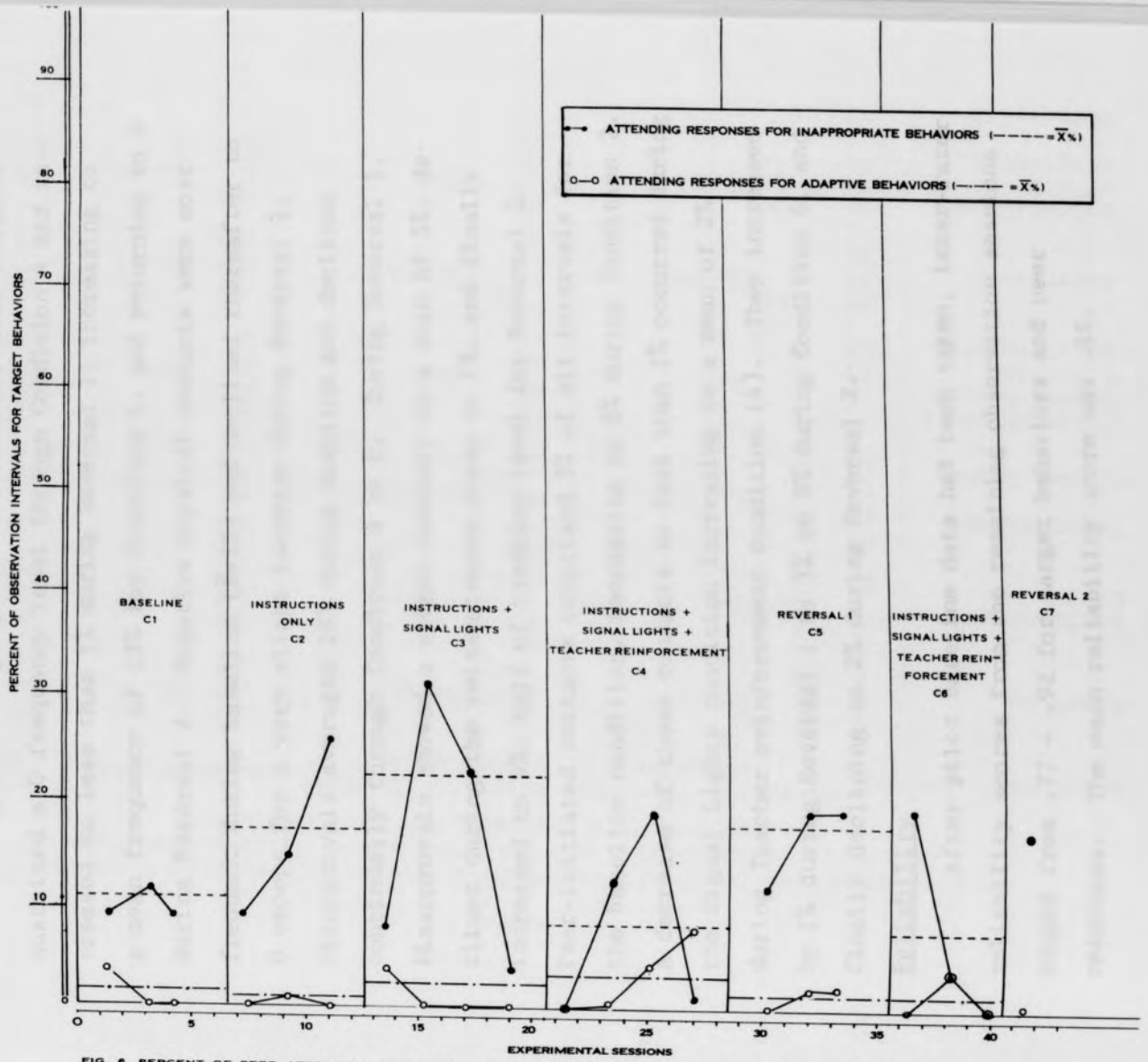

FIG. 6. PERCENT OF PEER ATTENDING RESPONSES FOR S's ADAPTIVE AND INAPPROPRIATE BEHAVIORS FOR EACH SESSION AND MEAN PERCENT FOR EACH CONDITION.

The frequencies of the remaining peer behaviors are presented in Table 1 since they occurred at a low rate throughout the program. Positive physical contacts sustained a 0 frequency level through Condition 4 and increased to less than 1% during Reversal 1, increasing to a mean frequency of 13% for Condition 6, and returning to 0 during Reversal 2. Negative physical contacts were most frequent during baseline ($\bar{X}$=2%) and declined thereafter to 0 except for a very slight increase during Reversal 1. Disapprovals averaged 18% during baseline and declined continually through Condition 4 to 0. During Reversal 1, Disapprovals showed a slight recovery to a mean of 5%, declined during the reinstatement phase to 1%, and finally increased to 9%, half of baseline level for Reversal 2. Peer-initiated contacts comprised 3% of all intervals for the baseline condition, increasing to 5% during Condition 2. A decrease of these contacts to less than 1% occurred during the Signal Lights condition increasing to a mean of 2% during Teacher reinforcement condition (4). They increased by 1% during Reversal 1 to 3% to 8% during Condition 6, and finally declining to 2% during Reversal 2.

Reliability

After pilot baseline data had been taken, inter-rater reliability scores from the remaining observation sessions ranged from .77 - .92 for target behaviors and peer responses. The mean reliability score was .85.

TABLE I

Peer Responses for Positive Physical Contacts, Negative Physical Contacts, Disapprovals, and Peer-initiated Contacts for Each Session and Mean Percents for Each Condition

Condition	Session	Positive Physical Contacts		Negative Physical Contacts		Disapprovals		Peer-Initiated Contacts	
Baseline	1	0	$\bar{X}$=.02	0	$\bar{X}$=.02	.03	$\bar{X}$=.18	.04	$\bar{X}$=.03
	3	0		.03		.23		.04	
	4	0		.03		.28		.01	
Instructions Only	7	0	$\bar{X}$=0	0	$\bar{X}$=.003	.02	$\bar{X}$=.02	.11	$\bar{X}$=.05
	9	0		0		.02		.01	
	11	0		.01		.02		.02	
Instructions + Signal Lights	13	0	$\bar{X}$=0	0	$\bar{X}$=.005	.0	$\bar{X}$=.04	.01	$\bar{X}$=.008
	15	0		0		.04		0	
	17	0		.02		.07		.02	
	19	0		0		.02		0	
Instructions + Signal Lights + Teacher Reinforcement	21	0	$\bar{X}$=0	0	$\bar{X}$=0	0	$\bar{X}$=0	.02	$\bar{X}$=.02
	23	0		0		0		.02	
	25	0		0		0		.01	
	27	0		0		0		.02	
Reversal 1	30	.01	$\bar{X}$=.003	.02	$\bar{X}$=.007	.08	$\bar{X}$=.05	.03	$\bar{X}$=.03
	32	0		0		.04		.02	
	34	0		0		.04		.03	
Reinstatement of all Contingencies	36	.06	$\bar{X}$=.13	0	$\bar{X}$=0	.04	$\bar{X}$=.01	0	$\bar{X}$=.08
	38	.13		0		0		.05	
	40	.16		0		0		.19	
Reversal 2	42	0		0		.09		.02	

CHAPTER V

DISCUSSION AND SUMMARY

Research has shown that a variety of classroom behaviors can be conditioned through adult-dispensed social and non-social reinforcers or through the use of group contingencies for individual and group problem behavior. Little research has been carried out to determine if the peer group can be trained in a similar manner. In the present study the prediction was made that if the peer group dispensed social reinforcers contingent upon S's adaptive behaviors, the adaptive behaviors would increase and the anti-social behaviors would decrease. A second prediction was made that if teacher reinforcement were made contingent upon peer-dispensed social reinforcers, peer reinforcement for pro-social behaviors would be strengthened.

The results of the present study indicated that if the teacher systematically reinforced the peer group for their appropriate dispensation of reinforcement to a classmate with behavior problems, their reinforcing behavior increased and S's behavior was more appropriate. Conditions 4 and 6, where Teacher reinforcement was added, provided the most reinforcing situation for both peers and S's responses. During these times, S's Adaptive behaviors increased to their highest level, whereas his anti-social

behaviors decreased to their lowest level. Peer's Approval responses were at their highest level in these conditions. Very likely, the Teacher reinforcement contingency served both as a reinforcing stimulus and a discriminative stimulus for the peer group. Whenever a child received reinforcement from the teacher, it served as a cue to the other peers and thus became a stimulus-response chain. Research has shown that this modeling effect is an effective way to change behavior. Bandura (1971) said "virtually all learning phenomena that result from direct experiences can occur vicariously as a function of observing other people's behavior and its consequences for them (p. 655)." He stated that reinforcement variables are necessary to translate the observational learning into action. They control the modeling cues to which a person is most likely to attend. From the present study, it was evident that the peers were responsive to social stimuli (teacher reinforcement) which strengthened their reinforcing behavior. Thus, previous findings on the small reinforcing value of social stimuli for pre-school children (Gewirtz, 1958a; Stevenson, 1961; Horowitz, 1963; Hartup, 1964; and Patterson & Anderson, 1964) may be refuted.

Over all conditions and sessions, the peer group ignored S's behaviors most of the time, results that have not been typically found by other researchers (Patterson & Brodsky, 1966; Solomon & Wahler, 1973). In fact, No-response

behaviors from peers were the most frequently occurring peer response, having been sustained at or above the mean baseline level (63%) for all conditions. Thus, S was not receiving much reinforcement for any behavior. However, peers were giving more Attending responses for Inappropriate behaviors than for Adaptive behaviors and more Disapprovals than Approvals for Adaptive behaviors during baseline conditions (Conditions 1, 5, and 7). Therefore, what reinforcement S did receive was for Inappropriate behavior during baseline.

Similarly, peers ignored pro-social behaviors more than deviant behaviors in general. The reason for this is not clear. The fact that No-response behaviors from peers remained high even for S's Adaptive behaviors was possibly because the peers had been reinforced prior to this experiment for ignoring anti-social behavior both as a result of previous treatment programs with S and instructions from teachers to ignore certain behaviors. Consequently, as a result of such prior conditioning, and since subject acted inappropriately much of the time, the peers had generalized their learning and ignored even pro-social behaviors. This situation is typical of other research findings where adults tend to ignore appropriate behavior and attend deviant behavior. It should be noted that during Conditions 4 and 6, peer Approvals for Adaptive behaviors were increasing at the same time S's Adaptive behaviors *per se* were increasing

and the Inappropriate behaviors were decreasing; and that the No-response behaviors were declining slightly, thus coming somewhat under the control of these contingencies. Moreover, peers ignored Inappropriate and Adaptive behaviors almost directly proportional to the frequencies of each. That is, when there was a high rate of Inappropriate behavior from S, there was also a high rate of No-response behavior from peers. When the rate of Adaptive behaviors was high or low, the rate of No-response was high or low respectively.

The peer group's Attending responses were generally higher for S's Inappropriate behavior than for his Adaptive behaviors. One reason for the doubled frequency of Attending behaviors for Inappropriate behaviors from baseline to Condition 3 (11% to 22%) was the probability of the novelty effect of the lights, although subsequent conditions apparently reduced this problem. Although the Attending responses were not very frequent for Adaptive behaviors, it should be noted the Approval responses were increasing for Adaptive behavior during Conditions 4 and 6, considerably above their baseline level, and thus would account for the low rate of Attending responses.

Apparently, despite reversals, peer behaviors were maintained at a higher frequency than S's behaviors as a result of conditioning procedures. No-response remained at a high rate; Disapprovals were maintained at a low rate;

Peer-initiated contacts showed some increase. The S's Initiation-to-peer contacts were usually inappropriate; and the effort to strengthen positive contacts was generally not successful. Appropriate contacts were affected by the teacher reinforcement contingency only for as long as it was in effect. Reversals revealed they could not be maintained. Peers' Approvals also were not maintained.

A major weakness of the present study was the lack of time for more experimental sessions. Patterson (1969) pointed out that in order to get stable estimates of social behavior, observations should be 20 minutes long over several days. Time limitations prevented allotting more than 3-4 days per condition. Also, the author believed that the particular part of the group activity (the story) had to be kept short because of the children's attention span. Thus, one reason for the failure of maintenance of Approvals and the other Peer-initiated positive contacts appears to have been the lack of time to include a greater number of conditioning sessions which would be needed to complete with the high rate of No-response behaviors. For the same reason, teacher reinforcement may not have been adequate to carry over into the reversal conditions. Since the experimental design called for a reversal, the teacher reinforcement was completely eliminated. In the ordinary teaching situation for maintenance to occur, the teacher would be most likely to give reinforcement on an intermittent schedule. Another

point brought out by Horowitz (1963) was that a reward only condition is least effective, but reward and punishment or punishment only tend to be most effective conditions for maintenance. For example, Wahler (unpublished) found that contingency shifting of adult attention did not reduce oppositional behavior, but with time-out added, there was significant reduction in oppositional behavior.

A second reason that S's behaviors were not well maintained might be found in some basic differences between the subject and the peer group. As was pointed out earlier, S had an IQ score in the dull-normal range and all the peers who had been tested ranked in the normal and bright-normal or above range. Also, all of the parents of the peer group were college graduates and S's grandparents were not. This kind of variable alone could affect the different kinds of experiences to which each had been exposed beforehand as well as the kinds of extra-experimental experiences taking place in the home. Such behaviors as sitting still, paying attention and ignoring inappropriate behaviors may have been established among the peer group but not with the subject due to different parental reinforcement variables.

Although S's Adaptive behaviors were maintained only for the duration of the treatment conditions, his Inappropriate verbal behavior occurred at a low rate and continued to decline throughout the program. Prior to the present experiment, S had exhibited a high rate of

maladaptive verbal behavior and was consequently subjected to a contingency management program. Data had been collected at that time which showed a decline of the behavior as a result of the program. Apparently, then, the weakening of this behavior was maintained in the present treatment.

The effects of peer reinforcement on S's behavior were somewhat confounded by the effects of the discriminative stimulus (2-light signal). The lights undoubtedly helped children to discriminate S's behaviors, although, in the absence of the lights, they did not notice Adaptive behavior and, therefore, there was no opportunity for peer reinforcement. However, it may be that the discriminative stimulus was a reinforcing and a punishing event for S moreso than peer Approvals since the green light meant something 'good' and the red light meant something 'bad.' These findings were similar to what Patterson (1965a) reported. In order to assess the separate effects of the lights and the peer reinforcement, it would have been necessary to include another condition first where the peer group received instructions explaining only the purpose of the lights without instructions to make approving statements. However, time did not permit this. The fact that S apparently could not discriminate his own behaviors when the lights were removed suggested that perhaps more sessions were needed to strengthen discrimination behavior. This would be further justified in view of Patterson's statement (1965b) that a

child with deviant behavior tends to be selectively responsive to social agents. It may be, of course, that S's behavior reversals were due to extinction of peer Approvals in those conditions. Although data were not collected on individual peer responses, some children were apparently more reinforcing to S than others. S zealously demonstrated his affection for one girl whenever she gave an approving response, and, in fact, often requested that she be allowed to tell him when he was being 'good.'

In conclusion, although peer Approvals were not well established (similar findings were reported by Solomon & Wahler, 1973), the results of the present study suggest that programmed reinforcement from the teacher seems to have great possibilities for increasing the probability of peer reinforcement to modify an individual's problem behavior. It was assumed that the peer group "valued" behaviors that the teacher valued. That is, it was reinforcing for the peers to follow her instructions. For the child who desires peer approval primarily, his behavior probably could be modified by use of peer reinforcement. Further research could deal with the problem of including more conditioning sessions to determine if the pre-school child can maintain approving responses for pro-social behaviors at a high rate over a longer period of time. Another problem would be to separate the effects of the discriminative stimulus and peer reinforcement. A third problem would be to employ teacher

reinforcement on an intermittent schedule rather than on a continual schedule and/or putting it on extinction procedure.

BIBLIOGRAPHY

Allen, K.E., Hart, B.M., Buell, J.S., Harris, F.R. & Wolf, M.M. Effects of social reinforcement on isolate behavior of nursery school child. In L.P. Ullmann & L. Krasner (Eds.), Case studies in behavior modification. New York: Holt, Rinehart & Winston, 1965.

Allen, K.E., Henke, L.B., Harris, F.R., Baer, D.M. & Reynolds, N.J. Control of hyperactivity by social reinforcement of attending behavior. Journal of Educational Psychology, 1967, 58, 231-237.

Bailey, J.S., Wolf, M.M. & Phillips, E.L. Home-based reinforcement and the modification of predelinquents' classroom behavior. Journal of Applied Behavioral Analysis, 1970, 3, 232-233.

Bandura, A. Psychotherapy based upon modeling principles. In A.E. Bergin & S.L. Garfield (Eds.), Handbook of psychotherapy and behavior change. New York: Wiley, 1971.

Barrish, H., Saunders, M. & Wolf, M.M. Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. Journal of Applied Behavioral Analysis, 1969, 2, 119-124.

Becker, W., Englemann, S. & Thomas, D.R. Teaching: A course in applied psychology. Chicago: Science Research Associates, Inc., 1971.

Bernal, M., Duryee, J., Pruett, H. & Burns, B. Behavior modification and the "brat syndrome." Journal of Consulting Psychology, 1968, 32, 447-455.

Birnbauer, J.S., Bijou, S.W., Wolf, M.M. & Kidder, J.D. Programmed instruction in the classroom. In L.P. Ullmann & L. Krasner (Eds.), Case studies in behavior modification. New York: Holt, Rinehart & Winston, 1965.

Bolstad, D.D. & Johnson, S.M. Self regulation in the modification of disruptive classroom behavior. Journal of Applied Behavioral Analysis, 1972, 5, 443-454.

Broden, M., Bruce, C., Mitchell, M., Carter, V., & Hall, R.V. Effects of teacher attention on attending behaviors of two boys at adjacent desks. Journal of Applied Behavioral Analysis, 1970, 3, 199-203.

Buehler, R.E., Patterson, G.R. & Furness, R.M. The reinforcement of behavior in institutional settings. Behavior Research and Therapy, 1966, 4, 157-167.

Buell, J., Stoddard, C., Harris, F.R. & Baer, D.M. Collateral social development accompanying reinforcement of outdoor play in a preschool child. Journal of Applied Behavioral Analysis, 1968, 1, 167-173.

Bushell, D., Wroebel, P.A. & Michaelis, M.L. Applying "group" contingencies to the classroom study behavior of pre-school children. Journal of Applied Behavioral Analysis, 1968, 1, 55-61.

Cooper, M.L., Thomson, C.L. & Baer, D.M. The experimental modification of teacher attending behavior. Journal of Applied Behavioral Analysis, 1970, 3, 153-157.

Endsley, R.C. & Hartup, W.W. Dependency and performance by preschool children on a socially reinforced task. The American Psychologist, 1960, 15, 399.

Erickson, M.T. The effects of social deprivation and satiation on verbal conditioning in children. Journal of Comparative Physiology and Psychology, 1962, 55, 953-957.

Goodall, K. This little girl won't interact with the other little girls and she crawls around alot. Psychology Today, 1973, 7, (1), 64-72.

Gewirtz, J.L. & Baer, D.M. The effect of brief social deprivation on behaviors for a social reinforcer. Journal of Abnormal and Social Psychology, 1958, 56, 49-56.(a)

Gewirtz, J.L. & Baer, D.M. Deprivation and satiation of social reinforcers as drive conditions. Journal of Abnormal and Social Psychology, 1958, 57, 165-172.(b)

Hall, R.V., Axelrod, S., Tyler, L., Grief, E., Jones, F.C. & Robertson, R. Modification of behavior problems in the home with a parent as observer and experimenter. Journal of Applied Behavioral Analysis, 1972, 5, 53-64.

Hall, R.V., Cristler, C., Cranston, S.S. & Tucker, B. Teacher and parents researchers having multiple baseline designs. Journal of Applied Behavior Analysis, 1970, 3, 247-255.

Hall, R.V., Fox, R., Willard, D., Goldsmith, L., Emerson, M., Owen, M., Davis, F. & Porcia, E. The teacher as observer and experimenter in the modification of disputing and talking-out behaviors. Journal of Applied Behavioral Analysis, 1971, 4, 141-149.

Hall, R.V., Lund, P. & Jackson, D. Effects of teacher attention on study behavior. Journal of Applied Behavioral Analysis, 1968, 1, 1-12.

Hall, R.V., Panyan, M., Rabon, D. & Broden, M. Instructing beginning teacher in reinforcement procedures which improve classroom control. Journal of Applied Behavioral Analysis, 1, 315-322.

Harris, F.R., Johnston, M., Kelley, S. & Wolf, M. Effects of positive social reinforcement on regressed crawling of a nursery school child. Journal of Educational Psychology, 1964, 55, 35-41.

Harris, F.R., Wolf, M.M. & Baer, D.M. Effects of adult social reinforcement on child behavior. Young Children, 1964, 20, 8-17.

Hart, B., Allen, E., Buell, J., Harris, F. & Wolf, M. Effects of social reinforcement on operant crying. Journal of Experimental Child Psychology, 1964, 1, 145-153.

Hart, B.M., Reynolds, N.J., Baer, D.M., Brawley, E.R. & Harris, F.R. Effects of contingent and non-contingent social reinforcement on cooperative play of a preschool child. Journal of Applied Behavioral Analysis, 1968, 1, 73-76.

Hartup, W. Nurturance and nurturance withdrawal in relation to the dependency behavior of preschool children. Child Development, 1958, 29, 191-201.

Hartup, W. Friendship status and the effectivness of peers as reinforcing agents. Journal of Experimental Child Psychology, 1964, 1, 154-162.

Hawkins, R.P., Peterson, R.F., Schweid, E. & Bijou, S.W. Behavior therapy in the home: Amelioration of problem parent-child relations with the parent in a therapeutic role. Journal of Experimental Child Psychology, 1966, 4, 99-107.

Herbert, E.W. & Baer, D.M. Training parents as behavior modifiers: Self-recording of contingent attention. Journal of Applied Behavioral Analysis, 1972, 5, 139-149.

Horowitz, F.D. Social reinforcement effects on child behavior. Journal of Nursery Education, 1963, 18, 236-284.

Kazdin, A. & Bootzin, R. The token economy: An evaluative review. Journal of Applied Behavioral Analysis, 1972, 5, 343-372.

Madsen, C.H., Becker, W.C. & Thomas, D.R. Rules, praise, and ignoring: Elements of elementary classroom control. Journal of Applied Behavioral Analysis, 1968, 1, 139-150.

Martin, G.L. & Powers, R.B. Attention span: An operant conditioning analysis. Exceptional Children, 1967, 33, 565-590.

McLaughlin, T. & Malaby, J. Reducing and measuring inappropriate verbalizations in token classroom. Journal of Applied Behavioral Analysis, 1972, 5, 329-333.

Medland, B.M., Michael, J. & Stachnik, T. Good behavior game: A replication and systematic analysis. Journal of Applied Behavioral Analysis, 1972, 5, 45-51.

O'Leary, K.D. & Becker, W.C. Behavior modification of an adjustment class: A token reinforcement program. Exceptional Children, 1967, 33, 637-642.

O'Leary, K.D., Becker, W.C., Evans, M.B. & Saudargas, R.A. A token reinforcement program in a public school: A replication and systematic analysis. Journal of Applied Behavioral Analysis, 1969, 2, 3-13.

Packard, R.G. The control of "classroom attention": A group contingency for complex behavior. Journal of Applied Behavioral Analysis, 1970, 3, 13-28.

Patterson, G.R. An application of conditioning techniques to the control of a hyperactive child. In L.P. Ullman & L. Krasner (Eds.), Case studies in behavior modification. New York: Holt, Rinehart & Winston, 1965. (a)

Patterson, G.R. Responsiveness to social stimuli. In L.P. Ullman & L. Krasner (Eds.) Research in behavior modification. London: Holt, Rinehart & Winston, 1965. (b)

Patterson, G.R. Teaching parents to be behavior modifiers in the classroom. In J.D. Krumboltz & C.E. Thoreson (Eds.), Behavior counseling: Cases and techniques. New York: Holt, Rinehart & Winston, 1969.

Patterson, G.R. Behavioral intervention procedures in the classroom and in the home. In A.E. Bergin & S.L. Garfield (Eds.). Handbook of psychotherapy and behavior change. New York: Wiley, 1971.

Patterson, G.R. & Anderson, D. Peers as social reinforcers. Child Development, 1964, 35, 951-960.

Patterson, G.R. & Brodsky, G. A behavior modification program for a boy with multiple problems. Journal of Child Psychology and Psychiatry, 1966, 7, 272-295.

Patterson, G.R., McNeal, S., Hawkins, N. & Phelps, R. Reprogramming the social environment. Journal of Child Psychology and Psychiatry, 1967, 8, 181-195.

Patterson, G.R., Shaw, D.A. & Ebner, M.J. Teachers, peers, and parents as agents of change in the classroom. In F.A.M. Benson (Ed.). Modifying deviant social behavior in various classroom settings. Unpublished monograph #1, Department of Special Education, University of Oregon, Eugene, Oregon, February, 1969.

Phillips, E.L., Phillips, E.A., Fixen, D.L. & Wolf, M.M. Achievement place: Modification of the behaviors of pre-delinquent boys within a token economy. Journal of Applied Behavioral Analysis, 1971, 4, 45-49.

Phillips, E.L., Phillips, E.A., Fixen, D.L. & Wolf, M.M. Behavior shaping works for delinquents. Psychology Today, 1973, 1, 75-79.

Ramp, E., Ulrich, R. & Dulaney, S. Delayed time-out as a procedure for reducing disruptive classroom behavior: A case study. Journal of Applied Behavioral Analysis, 1971, 4, 235-239.

Reynolds, G.S. A primer of operant conditioning. Glenview, Illinois: Scott, Foresman & Company, 1968.

Schmidt, G.W. & Ulrich, R.E. Effects of group contingent events upon classroom noise. Journal of Applied Behavioral Analysis, 1967, 2, 171-179.

Schutte, R.E. & Hopkins, B.L. The effects of teacher attention on following instructions in a kindergarten class. Journal of Applied Behavioral Analysis, 1970, 3, 117-122.

Schwartz, M.L. & Hawkins, R.P. Application of delayed reinforcement procedures to the behavior of an elementary school child. Journal of Applied Behavioral Analysis, 1970, 3, 85-96.

Scott, M.P., Burton, R.V. & Yarrow, M.R. Social reinforcement under natural conditions. Child Development, 1967, 38, 53-63.

Skinner, B.B. Science and human behavior. New York: MacMillan, 1953.

Solomon, R. & Wahler, R. Peer reinforcement control of classroom problem behavior. Journal of Applied Behavioral Analysis, 1973, 6, 49-56.

Stevenson, H. Social reinforcement: Children as a function of chronological age, sex of experimenter, and sex of subjects. Journal of Abnormal Social Psychology, 1961, 63, 147-154.

Stevenson, H.W. & Fahel, L.S. The effect of social reinforcement on performance of institutionalized and non-institutionalized normal and feeble-minded children. Journal of Personality, 1967, 5, 278-293.

Surratt, P.R., Ulrich, R.E. & Hawkins, R.P. An elementary student as a behavioral engineer. Journal of Applied Behavioral Analysis, 1969, 1, 85-92.

Wahler, R.G. Child-child interactions in free field settings: Some experimental analyses. Journal of Experimental Child Psychology, 1967, 5, 278-293.

Wahler, R.G. Behavior therapy for oppositional children: Love is not enough. Paper presented at Eastern Psychological Association Meeting, 1968.

Wahler, R.G. Oppositional children: A quest for parental reinforcement control. Journal of Applied Behavioral Analysis, 1969, 2, 159-170.

Walker, H.M. & Buckley, N.K. Programming generalization and maintenance of treatment effects across time and across settings. Journal of Applied Behavioral Analysis, 1972, 5, 209-224.

Walker, H.M., Mattson, R.H. & Buckley, N.K. The functional analysis of behavior within an experimental class setting. In W. Becker (Ed.), An empirical basis for change in education. Chicago: SRA, 1971.

Ward, M. & Baker, B. Reinforcement therapy in the classroom. Journal of Applied Behavioral Analysis, 1968, 1, 323-328.

Zeilberger, J., Sampen, S. & Sloane, H. Modification of a child's problem behaviors in the home of mother as a therapist. Journal of Applied Behavioral Analysis, 1968, 1, 47-53.

Zimmerman, E.H. & Zimmerman, J. The alteration of behavior in a special classroom situation. Journal of the Experimental Analysis of Behavior, 1962, 5, 59-60.

Zimmerman, C.H., Zimmerman, J. & Russell, C.D. Differential effects of token reinforcement on instruction following behavior in retarded students instructed as a group. Journal of Applied Behavioral Analysis, 1969, 2, 101-112.

Zimmerman, E.H., Zimmerman, J. & Russell, C.D. Differential effects of token reinforcement on "attention" in retarded students instructed as a group. Unpublished paper presented at The American Psychological Association, San Francisco, September, 1968.